

ORAL HISTORY OF THE
TENNESSEE VALLEY AUTHORITY
INTERVIEWS WITH
CHARLES YOUNG

BY CHARLES W. CRAWFORD
TRANSCRIBER - SHARON HESSE
ORAL HISTORY RESEARCH OFFICE
MEMPHIS STATE UNIVERSITY

BRISTER LIBRARY

*This book printed
and bound
through a gift
from
Major Ben R.
and Kathleen J. Schultze.*

MISSISSIPPI VALLEY COLLECTION



4652 4279 DHT 8/28/92



MEMPHIS STATE UNIVERSITY
LIBRARIES

MVC

TC

425

T2


Y68x

1970

UNIVERSITY OF MEMPHIS LIBRARIES



3 2109 00699 7283



Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

<http://archive.org/details/oralhistoryoften00youn>

ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY

INTERVIEW WITH CHARLES YOUNG

JUNE 17, 1970

BY CHARLES W. CRAWFORD

TRANSCRIBER - SHARON HESSE

ORAL HISTORY RESEARCH OFFICE

MEMPHIS STATE UNIVERSITY

MEMPHIS STATE UNIVERSITY
ORAL HISTORY RESEARCH OFFICE

I hereby release all right, title, or interest in and to all of my tape-recorded memoirs to the Mississippi Valley Archives of the John Willard Brister Library of Memphis State University and declare that they may be used without any restriction whatsoever and may be copyrighted and published by the said Archives, which also may assign said copyright and publication rights to serious research scholars.

PLACE Helena World
Helena, Arkansas

DATE June 28, 1968

C. M. Young
(Interviewee)

Charles Crawford
(For the Mississippi Valley Archives
of the John Willard Brister Library
of Memphis State University)

THIS IS THE ORAL HISTORY RESEARCH OFFICE OF MEMPHIS STATE UNIVERSITY. THIS PROJECT IS "AN ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY." THE PLACE IS SHEFFIELD, ALABAMA, MUSCLE SHOALS. THE DATE IS JUNE 17, 1970, AND THE INTERVIEW IS WITH MR. CHARLES YOUNG, FORMERLY WITH THE TENNESSEE VALLEY AUTHORITY. THE INTERVIEW IS BY DR. CHARLES W. CRAWFORD, DIRECTOR OF THE MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE, AND WAS TRANSCRIBED BY MRS. SHARON HESSE.

CRAWFORD: Mr. Young, I suggest we start with some summary of your background, where you were born, what you did after that up until you joined TVA.

YOUNG: I was born in San Francisco, and I'll just say it's been a number of years ago. I was raised in Washington, D. C. and went to the Catholic University of America in Washington, D. C. and received a B.S. degree in chemical engineering in 1920. Immediately following my graduation, I went to work for the Phipps Nitrogen Research Laboratory in Washington, D. C. and worked on the development of ammonia catalyst.

As you probably know, these plants at Muscle Shoals were built in World War I, and they were built at a time when we had little experience in this country on the fixation of nitrogen. So the government built two nitrate plants here, one

to produce ammonium nitrate by the cyanamide process, and the second plant by the harbor process. Well, it was in connection with the harbor process that we were trying to develop ammonia catalyst. The plant in Muscle Shoals, while it was constructed and attempts made to operate it, it never was successfully operated. Also at that time we knew that plants were being operated under this process in Germany. And the fact of the matter is that it's probably due to the success that the Germans were having in making ammonium nitrate through this harbor process that they felt independent of the Chilean nitrate deposits for their source of raw materials for their explosives.

I worked at the Phipps Nitrogen Research Laboratory, which at that time was under the army and was formed for the purpose of carrying on research work to find out what the problems were in Muscle Shoals. And as I say, my work was in connection with the development of ammonia producers in this country who were becoming interested in the possibility of developing synthetic ammonia processes and the National Ammonia Company worked with the Phipps Nitrogen Research Laboratory in designing a small plant. This plant was designed to produce-- which now is a very insignificant amount of ammonia--but it produced about five tons of ammonia a day. And at the completion of the design work at the Phipps Nitrogen Research Laboratory, I was employed by the National Ammonia Company to go to Seattle, Washington and to supervise the building and operation of this

facility. Now, the National Ammonia Company at that time did have an ammonia plant in Seattle which was producing ammonia by the old process from gas plant liquids. They built this plant that I was to operate right adjacent to that. You know, in those days the chief outlet for ammonia was for refrigeration and not fertilizer in those days.

So I operated that plant in Seattle up until about 1930, at which time the DuPont Company had absorbed the National Ammonia Company and had built a large plant at Bell, West Virginia. So they decided to shut down this plant in Seattle and they transferred me to Bell, West Virginia where I had charge of the water gas division in the plant at Bell. And I was there up to the depression in the early part of 1933, at which time I then came with the Tennessee Valley Authority. I was employed by the Authority in Washington and sent down here to join a group which were inventorying the plant facilities which were to be transferred under the act of the Corps of Engineers to the TVA.

Well, I might say at that time the operations here were under the direction of Mr. Arthur Miller. And shortly after that or about that time the TVA employed Dr. Harry Curtis as the Chief Chemical Engineer. I happened to have known Dr. Curtis, having met him at the Phipps Nitrogen Research Lab while he was doing the selling work for the army in the early days on ammonia plants.

CRAWFORD: Let's start now with your experience with TVA when you did get here in 1933, and I'll make a few notes as we go along to ask questions when we get back to them.

YOUNG: Well, the first thing, I transferred from the inventory group to the regular TVA staff in connection with the operation of the facility. The first job I had was to reconstruct the railroad facilities here in the plant. There was something like maybe fifteen or twenty miles of railroad facilities which hadn't been used for fifteen or eighteen years, and it was my job to go out and reconstruct those railroad facilities. Incidentally, the ties for the railroad tracks had all disappeared. The wood had gone, but the rails were still there, and the spikes were still laying there on the ground. So if you could get rid of the weeds, which we did, why, you could find the tracks and we started reconstructing them. I had no experience up until that time in building railroad facilities, but Dr. Curtis asked me if I knew how to build a railroad, and I said, "No, I hadn't, but I'm sure I could," and I did.

When the TVA received these plants, of course, the problem was how were they going to be utilized in accordance with the directions of the act. Between the period of 1918 and 1933, the cyanamide process, which was used there in the plant for nitrogen, had become obsolete. And it was determined that

what the valley needed most in those days was probably phosphate, and it was a question of how to utilize facilities to develop phosphate fertilizers. The decision was made to go into the development of phosphate fertilizers initially because of the need for that field.

I might say here that the phosphate fertilizers in those days contained about 16 or 18 percent plant food, and the Authority, of course, wanted to do what it could to increase and improve the processes for making phosphate fertilizer. It so happened that the original plant had some electric furnaces here that we used to make carbide. And while we couldn't use those furnaces, we could use the electrical facilities which were her. By taking out the old furnaces, the Authority began to design and did design and construct furnaces for making phosphorus. Of course, during those days the Authority talked to the fertilizer people about the use of superphosphate instead of ordinary phosphate. And it is rather interesting to recall that the fertilizer people were not interested particularly in seeing the Authority going into the development of superphosphate, one reason being that they said, well, the farmers wouldn't use superphosphate. Their dads and so forth had used this low-grade phosphate, and it would be a tremendous job to change it. Well, the Authority went ahead on that program anyway and built two electric furnaces. They were installed--the actual construction work was done by Stone and Webster.

CRAWFORD: How did you feel about that change to superphosphate, Mr. Young?

YOUNG: Well, I might say this: that the phosphate reserves in the United States are primarily located in three areas. The bulk of the phosphate reserves are in the far west. The second largest reserve is in Florida, and the third is up here in Tennessee. Well, it was evident that someday we were going to have to depend on the far west for our fertilizer raw materials, and unless we could increase the plant food content, there would be a tremendous expense in the freight and handling costs and so forth for low-grade fertilizers.

Of course, that's also true for the immediate use of saving freight and handling costs--anything we could do to increase the plant food content further. So we were very enthusiastic about the possibilities of making superphosphate. The superphosphate had been made previous to that time but in very, very small quantity. But this gave us a basis for going ahead on a fairly large scale to give us some high-grade phosphate fertilizer and to initiate a program with the farmers of the country in the utilization of improved fertilizer.

Previous to the TVA coming into the picture here, the Department of Agriculture had been doing research work on fertilizers and other methods of helping the farmers. But as I had one of the county agents tell me in the early days, they

often received reports on the experimental work done by the Department of Agriculture, but he simply filed them away, and that's all there was to it. Now with TVA coming along into the picture and actually producing fertilizer, it actually gave them some tools to work with so that they could go out and actually work with the farmers. Well, the program, of course, developed a little slow at first. While this facility here was producing the superphosphate, our agricultural relations group was located in Knoxville under Mr. McAmis, and it was their responsibility to develop the program with the farmers and to get the fertilizer out for testing in the field. So while he was developing that program we went ahead with the development of the production of the material down here, and we used to have quite a few battles between the two of us--us producing the staff and getting after him to get his part of the program going, and getting rid of the material.

Well, that was a big program and it turned out to be a very successful program, and we produced superphosphate over a great number of years. And we increased our furnace facility--building additional furnaces. And it wasn't too long before we began to do experimental work on other products besides the superphosphate. In fact, we established here the laboratories which did the research work, and also we had groups doing powder plant work in developing processes. And the second product which came along, I believe, was calcium phosphate,

which was also a still higher concentrated material than superphosphate. While we were doing this down here, the Ag-relations Division in Knoxville were making the contacts with the farmers and developing their programs. And it wasn't too long before we came to World War II, in which time the army--the Ordnance Department came to us and told us that they wanted ammonium nitrate for explosive use. Here again, there's quite a story because there was some controversy between private industry and the War Production Board and TVA regarding us--TVA--building an ammonia plant here at Muscle Shoals and producing ammonium nitrate. The private industries, I believe, were a little afraid that after we got this plant going we might get into competition with them in ammonium nitrate and other things in the fertilizer field after the emergency was over. But anyway, authorization was granted and we went ahead and built a synthetic ammonia plant here and rehabilitated the lower end of the plant--original plant--to make ammonium nitrate, and we got into production of ammonium nitrate. And the army, of course, during the emergency took the full production of our facilities. At the same time the army wanted phosphorus for incendiary bombs and so forth, and we continued to increase our capacity and produce and divert elemental phosphorus to the army for use in incendiary bombs.

After the war was concluded, the army in the meantime had built a number of nitrate plants around the country, and the question was what could be done with these nitrate plants, at the

same time recognizing that there was demand for nitrate fertilizers. Well, the Authority carried out research work here and developed a process for conditioning ammonium nitrate so that it could be used as a fertilizer. And we worked with people interested in utilizing the other plants and assisted them in developing the conditioning process for making ammonium nitrate. And eventually most of the other plants were purchased by private industry and went into the production of ammonium nitrate fertilizers. In connection with our work on the ammonia plant and ammonium nitrate operations, well, the Authority has, as you know, a policy that any information we develop here is available to the general public. And we had a great number of people coming here for information on how to build and operate and make nitrate fertilizer.

CRAWFORD: May I ask a question before we get away from this, Mr. Young. Has this information you developed been widely used?

YOUNG: Yes, yes. One time I think practically all the nitrogen producers had contacted and visited the plant here, and got information. And the same thing is true when I worked with the phosphate and the production of elemental phosphorus. You know, in the early days there, little phosphorus was produced in this country, but the information

was privately held and very exclusive--closely kept. And it was the same thing with the production of ammonia. While there were ammonia plants in the country, the information was not available to the public, and this was the first opportunity where they could get that information. In fact, I had one of the vice presidents of one of the big chemical plants tell me at one time: he said he liked TVA, but the only fault that he could find with it was that it gave his competitors a million dollars worth of information.

CRAWFORD: Did the people who used this generally give TVA credit?

YOUNG: Some did and some didn't.

CRAWFORD: Did they seem to mind people knowing that they got it from TVA?

YOUNG: I don't think they advertised the fact, and I don't believe they tried to hide the information. Of course, TVA issued publications and so forth which generally distributed the information and then worked closely with the fertilizer co-operative people. And our relationship with the farmers' co-operatives was very, very good. There was one thing about the TVA work which always gave us a great deal of

pride was the fact that we made available to the small fertilizer producers and the industrial producers information which otherwise they would not have or they could not afford to carry research work on themselves.

CRAWFORD: What size research staff did you keep?

YOUNG: We had several hundred people here on research in various phases. Our agricultural people were carrying their work separate in Knoxville in those early days, but here we had people doing basic research and applied research and pilot plant work. The theory on which we operated and developed these processes was . . . Of course, the original ideas would come from anywhere, but they're usually developed up through the laboratories and into the pilot plant stage. And following the pilot plant stage, the Authority would build and operate a commercial size unit; that is, a unit big enough so that the information could be obtained for commercial operation, the idea being that we had an agricultural program which was trying the material out in the fields. We had a unit in the plant head which was developing and getting the bugs out of the process on a sufficient size so that the industry could adopt that. Therefore we were really doing all the work; we were doing the basic work and were also developing the market in the field. The interesting thing, too, even though the fertilizer industry

didn't particularly like us in the early days because we proposed competition, it was developed fact that where TVA fertilizer was used in the fields that the fertilizer consumption in that area increased beyond what TVA was doing so that we were really helping the farmer and the fertilizer industry.

CRAWFORD: Did they ever come to realize that?

YOUNG: I believe they did in later days. In fact, the situation today, I think, is entirely different. As I understand it, the fertilizer people work closely with TVA in these developments. I hope I've made the picture clear just to how the TVA was trying to function here; in that we were trying to develop the process in the laboratories, in the pilot plants-field, at the same time in the field, with the idea that the fertilizer industry could adopt that processing and go ahead with it with a minimum expense to them.

CRAWFORD: Yes, sir, I believe that's clear. How much good did that do for the economy of the valley?

YOUNG: Well, I wouldn't be able to give you figures on that, but it certainly increased the yields and got into the question of cutting down erosion and those kind of things. I think you can get a better answer to that from our agricultural side of the picture because during those days my job here was to

try to make the materials while the ag-relations people were in the field of distribution.

CRAWFORD: Did you ever get ahead of them in your production?

Did you ever turn it out faster than they could dispose of it?

YOUNG: Yes, unfortunately that happened occasionally, and

that was one of the disadvantages we had here in the Authority of having our agricultural relations people about 300 miles from our production end of the thing here. And many a time I sat at the desk, on the telephone contacting our ag-relations people to see if they can't relieve us from our situation on storage problems in the plant. Of course, that has been largely eliminated by the fact that now both divisions are here at Muscle Shoals. The ag-relations people are located here, which took place about 1960.

CRAWFORD: Do you believe that makes for better operations?

YOUNG: Well, I'm sure it does. It gives the ag-relations people an opportunity to see what our problems were, and we really realize what their problems are, and by working together, I'm sure it's much better and we worked out quite satisfactorily.

CRAWFORD: Can you explain something about the difference in the value of nitrogen and phosphate for this region?

YOUNG: I can say this: the original conception, which I've heard Dr. Harcourt Morgan speak about it, was that what the valley needed was phosphate fertilizers, and the nitrogen fertilizers, he felt in those early days, could be obtained by the use of legumes which would put nitrogen back into the soil. Now, everybody, I don't think, agreed with that philosophy, and it certainly didn't hold true, I believe, after the development of ammonium nitrate for fertilizer use. It kind of changed the picture.

Of course, another indication of the effects on the fertilizer industry is the increase in the plant food of the fertilizer consumed in the country. In those early days it was along about 16 or 18 percent plant food, and while the Authority doesn't claim all credit for it since the development of the Authority, it has gradually increased tremendously. In fact, I think the estimate today is probably double the original figures.

CRAWFORD: When was the first time you saw the Tennessee River Valley?

YOUNG: The first time I saw the Valley was in 1933 when I came here, but I had known about the valley because of my connection with the Phipps Nitrogen Research Laboratory, which was organized by the government to carry out the development work due to the problems they had here in 1918.

CRAWFORD: Have you noticed much improvement in agricultural conditions and crop productivity in the time you've been here?

YOUNG: Oh, yes, a tremendous amount, a tremendous amount of increase. You can see it just by going out and looking at the country, especially if you fly over this part of the country, you can really see a tremendous difference in agriculture.

CRAWFORD: Has the agricultural fertilizer you produce been used extensively in this Valley?

YOUNG: Yes, and as I say, you get a better picture of the agricultural side from some of the people in that group. You see, the testing process was laid out for the idea of test demonstrations of farms and so forth in the area and also outside of the Tennessee Valley. In fact, I think

practically all of the states have some work with TVA fertilizer going on, but the bulk of it, of course, was done in the valley. And of course, the farmers come here; they hold their meetings; they hold meetings here with farmer groups, and our people are the generally contacting farmers. And the TVA works very closely with the land-grant colleges in their work on fertilizer.

CRAWFORD: What size operation did you maintain usually here; how many employees did you generally keep?

YOUNG: Well, starting out in the early days where there was a matter of a few hundred, it worked up until World War II--there was, 1400 or 1500 people, and during the Korean War, I think there was something like 2000 people we had at one time here. Of course, that's cut back considerably, depending on the extent of the operations.

 Another thing that's, I think, of interest to you would be how we try to operate these facilities here. In other words, we try to operate a fertilizer plant at more or less a constant level of output. And the problem is that as you develop one fertilizer and carry it through cycle to where you say it's been demonstrated, you hope that your laboratories and your pilot plant work has come along so that you have a second one to fall in and take that place. And that's one of

the problems that we always had was keeping after our research and development people to try to get them to keep up with the-- or keep ahead of us so that when we get through demonstrating a particular product we will have some other products to come in. Now, that wasn't a particular problem in the early days because it took a long time to get the demonstration and the acceptance of the product. But as TVA has gone along and as the farmers and the fertilizer people have gained more confidence in them, why, it takes a shorter time to demonstrate the product, which creates the problem of having more products coming along so as to keep an operating personnel going. So it'll give you a lot of gray hairs over the years trying to get that thing going.

CRAWFORD: How did you make decisions about what to produce?

YOUNG: The decisions were made through recommendations of the local staff to the Board of Directors, and the Board of Directors made the final decision when we would go into a new product. Of course, also where the new product involved building new plant facilities, we'd have to go to the Congress to the Bureau of the Budget and the Congress for the funds to carry out the program. And there again, over the years I think the relationships have improved considerably. They

used to have quite a lot of problems, quite a lot of arguments with the Bureau of the Budget and the others, trying to get things authorized.

CRAWFORD: Did you generally feel that these things paid for themselves?

YOUNG: Well, I'm not sure what you mean by paid for themselves. We were in the early days here able to get enough funds returned from the sales of the fertilizers to pay for the operating facilities. Now, that became more and more difficult as time went on and we got a greater number of products and also the inflation and other things that come into the picture, it becomes more and more difficult. At the same time, the Authority was distributing these products at a cost to make it attractive to the farmers to try these materials. In fact, in the early days I think all the farmers paid in those days was the freight and handling costs, and later on they began to charge them money in accordance with the way they felt that we were contributing to their program.

But during the times of the war when we had the government taking a certain percentage of our products for war purposes, we were able to actually make a little money on it, which was, of course, not the object of the program. In fact, I had the directors tell me at one time, "to be careful, that you were making too much money," which seemed rather strange.

CRAWFORD: Did you feel that it was a handicap having the headquarters of TVA at Knoxville and the plant this far down the river?

YOUNG: Well, of course, there were more things involved in the TVA program than just the fertilizer program. In fact, the power division is all over the valley, and I think the Authority tried to pick what was a fairly central location where they had facilities--transportation facilities--and so forth and so on. Yes, it meant that we had to travel quite often, and in those days the traveling wasn't very convenient either.

CRAWFORD: Did you travel mainly to Knoxville?

YOUNG: Mainly, yes, to Knoxville. And in the early days we took the train which was an overnight trip to Knoxville, and you work all day and then the next night you catch the train and come back, so you were shot for about two days when you made the trip.

CRAWFORD: Was it practically an all-night trip?

YOUNG: Yes. You'd get on here maybe 10:30 or 11:00 at night, and the train would pull into Knoxville in

the morning--sleeper in the morning--so you had to get off right around seven o'clock or something like that, and you'd spend the day and then come back the next night. Yes, it was some handicap to us, but considering the whole Authority, it made sense. The original act said that the headquarters would be at Muscle Shoals.

CRAWFORD: Yes, and it is, legally, in the bylaws.

YOUNG: Legally, I believe, it is the board meeting place.

CRAWFORD: And I believe the official seal is here, and some sort of secretary maintained.

YOUNG: You know, this plant had the dual purpose of serving the agricultural as well as the national defense, and I think it created a real good morale in the organization. They were feeling like they were making a real contribution both to agriculture and to the national defense. And the fact of the matter is, we could at times use our product to either feed somebody or make something to feed somebody, or the next day we could ship it out to maybe kill somebody, so I mean, you had that flexibility, which makes a very valuable installation.

I don't think anybody could realize that here was an installation, and I don't know how many millions of dollars

these facilities cost the government in 1918, but here it looked like they were entirely wrong, and of course, the government considered at one time to possibly either lease or sell these facilities. And you remember Henry Ford got into the picture here. In fact, the whole section of the country out here was developed into streets and lamp posts and everything, anticipating the building of what they called Ford City out here.

CRAWFORD: I believe several industrialists were interested for a while in the capability.

YOUNG: Yes, yes. And, of course, it was the matter of maybe fifteen or eighteen years that the debate went forth in Congress. And Senator Norris, I think, was given a lot of the credit for really following this thing through until it developed into the Tennessee Valley Authority Act, and he did a lot for the valley. Of course, when the Korean situation came along in 1950, we were, of course, counting on our fertilizer program and the Chemical Board came to us and they wanted the location for a facility to develop an intermediate product for the manufacture of nerve gas. And they contracted with the Authority and they built the facility here at Muscle Shoals, and the TVA provided the operating personnel and actually operated the facility for the Chemical Board. In fact, the facility is still there and is being maintained in stand-by condition.

CRAWFORD: TVA has gotten a great deal from this Muscle Shoals plant. Did you work closely with Dr. Curtis?

YOUNG: Yes, his title was Chief Chemical Engineer, and he, until he became a board member, had direct charge of all these operations, and he spent considerable time here. In fact, Dr. Curtis was here during World War I and had charge of one of the laboratories at one of the nitrate plants during World War I.

CRAWFORD: What sort of person was he, Mr. Young? As you know, I've not gotten to interview him. What was his background before coming to TVA?

YOUNG: Well, I don't know too much of his background except he was born in the West and worked very hard during his early life, and he was a professor at Yale before he came to the Authority, and he did considerable work with the army. He went to Europe after World War I and participated in examining the plants and so forth for production and fixation of nitrogen. And he was a very, very competent man and well thought of man. And he had the characteristic of being able to tell you exactly what he thought, and he didn't hesitate to do it.

CRAWFORD: He kept that after he became a board member, of course.

YOUNG: Yes, yes, yes.

CRAWFORD: Did you have any association with Harcourt Morgan?

YOUNG: No, not except the trips he used to make here while he was a board member. He at one time was the President of the University of Tennessee, as I understand it, or the Dean of Agriculture; I'm not sure which.

CRAWFORD: Both, I think, consecutively.

YOUNG: Yes, and he was a very, very enthusiastic man, and he didn't know any details about the chemical operation, but he gave it 100 percent support and was behind us all the time. And we were sorry to lose him. Of course, one advantage on the board, in the early days they had a man who was very qualified, Lilienthal, in the electrical field, and Dr. Morgan was very talented in the agricultural field, which gave us a pretty . . .

CRAWFORD: And the other board member, of course, was a hydraulic engineer, so they had many things represented.

YOUNG: You're talking about Arthur Morgan?

CRAWFORD: Yes.

YOUNG: Arthur E. Morgan, yes.

CRAWFORD: And as you know, they divided the responsibilities rather early in TVA; this, I believe, being under Dr. H. A. Morgan, wasn't it?

YOUNG: Yes.

CRAWFORD: What was your title when you came to work for TVA, Mr. Young?

YOUNG: Chemical Engineer. I came in in the inventory as Chemical Engineer. I believe my title when I started on the railroad was Construction Engineer, and then I had a series of titles from Chief of Operations, Superintendent and up to the management of the Office of Chemical Engineering.

CRAWFORD: That's what you were at the time you retired?

YOUNG: Yes, just prior to the time I retired, and then they consolidated. I believe my final title was Chief Chemical Engineer, which was just a carry-over until my

replacement got broken in and took over. You see, up until the sixties we had the two separate divisions. And it was in the sixties, I believe, that they brought down the agriculture group from Knoxville and combined them under one head. In the early days there were two heads.

CRAWFORD: That simplified things administratively, didn't it?

YOUNG: I'm sure, yes. Sure.

CRAWFORD: Why did you go to work for TVA, Mr. Young?

YOUNG: Well, at the time I went to work for TVA it was during the depression and I was out of work, which I thought was a pretty good reason. But it so happened that this tied in with what I had been doing before hand so well that when I applied with TVA they had already taken on some people from the Phipps Nitrogen so I was acquainted with the people they were hiring for TVA, and they knew my background along this line.

CRAWFORD: Did you generally have very capable people in the first years of TVA?

YOUNG: Yes. I think, exceptionally. As I said, I worked

for DuPont and worked for several other companies, and I've never been with an organization that I thought had greater capability. And not only that, but there was less friction in the organization and the morale was very high.

CRAWFORD: Do you suppose that was because of the depression, or do you suppose that was because you had some very dedicated people recruited in the early period?

YOUNG: I think it's because we had dedicated people. And as I say, I think the whole object of what we were trying to do and the program and the participation, in both the agricultural field and national defense, really gave the people a sense of contributing to something worthwhile.

CRAWFORD: Have you enjoyed living in the Tri-Cities area?

YOUNG: Very much, very much. I lived in Seattle for a number of years, and I thought at that time when I retired I'd return to Seattle, but after being down here for this period of time I think this an ideal place to live, and certainly a nice place to raise a family. I don't know whether I've given you all the things that you want.

CRAWFORD: Yes, sir, exactly right. Are there any other parts

that you think should be a part of this account of your activities?

YOUNG: Well, I felt like we were able to carry this thing along to a point where we recognized TVA's contributions and were recognized in this field--in agriculture and so forth--and my regret is that I was not able really to carry on to see these further developments that are coming along in these later years and are still to be made. While we've made great improvements in fertilizers, there's still room for further improvements. In other words, they're making fertilizers today that contain 60 to 75 percent plant food, and maybe someday they'll reach practically 100 percent plant food.

CRAWFORD: There has been improvement, hasn't there?

YOUNG: A very definite improvement, and when you think of it in the early days where a man was getting a sack of fertilizer that had 16 percent plant food and the rest was dirt or bulk. Just look what he was paying for in the shipments, in the handling and so forth.

CRAWFORD: Transportation cost.

YOUNG: Transportation. Whereas today you're getting up

in the field where you're getting something for your money, and the farmers have been saved millions of dollars.

CRAWFORD: And TVA developed that--making its developments available to everyone.

YOUNG: Well, the work that TVA has done, of course, in the research and other activities is patented. And the Authority has maybe, I don't know, today maybe 150 patents and so forth in this field here, and a right to use these patents are granted to anybody who wants to use them on a royalty-free basis. So the patents or the processes being developed by the Authority are being used, I'm sure, in 300 or 400 different plants in the country today.

CRAWFORD: And those products are being sold, aren't they?

YOUNG: Products are being sold, yes. Of course, the Authority for a long time, during the development, supplied some of these high analysis fertilizers to the fertilizer people for them to add into their products just to show what can be done to improve the plant food.

CRAWFORD: Well, this has been sort of a show place. Have you had a lot of visitors from other places to study

your facilities here?

YOUNG: Yes, starting way back early they began to come in--fewer in the early days, but it's gradually increased over the years, and today the Authority always has a group of visitors here. And the thing that makes it so interesting is the fact that we hear so much about population explosion and so forth and feeding the millions and billions of people in the world. Well, nothing that I know of can contribute more to the answer to that thing than improving fertilizers so that you can grow food. And TVA right today, I'm sure, has people in other parts of the world trying to help these various backward countries to improve and produce fertilizer. And practically all the free world send people here to spend time here at the plant with our research people and our plant people. In fact, we have trained people out in the plant to go out for these companies and go out to run their plants, which is a tremendous thing in my opinion. How can you do anything more to help?

CRAWFORD: Do you train your personnel so that they can leave TVA and take private positions?

YOUNG: That's right. Or they can bring in personnel--there are private people who send in personnel here, and

we will train them in the operations in our plant so they can go back and operate their plant.

CRAWFORD: You certainly work well with private industry, don't you?

YOUNG: Yes. It's been a tremendous help to the whole country, as I see it, and to the world--all the free world. We have people, I'm sure--I'm not familiar with it, I haven't been there in a long time, but I'm sure--I know some of the people who are over in India and over in Japan and over in the various parts of the country are on fertilizer jobs, trying to help people in these various countries. So, I can get awful enthusiastic about this thing because it's a tremendous thing. It's such a worthwhile thing and a fellow that's spent the years I have in it, I don't think you can help but feel enthusiastic about the possibility that his small part in the contribution has helped along the line.

CRAWFORD: Well, the motive has been essentially service, hasn't it?

YOUNG: Service. Service, that's right.

CRAWFORD: It's a very impressive operation.

YOUNG: And they haven't reached the peak yet. There's still plenty of opportunities in the field to go ahead.

CRAWFORD: What would you guess the future directional development would be in the chemical plant at TVA?

YOUNG: Well, I think to shoot at some day getting 100 percent plant food fertilizers.

CRAWFORD: How close are you to that now?

YOUNG: Well, I think in the laboratories up there they probably have been able to produce plants that-- well, you take elemental phosphorus. The plant food--the phosphorus content of a plant is in terms of P_2O_5 , see. Elemental phosphorus itself is 229 percent P_2O_5 , so it's over 100 percent in terms of what they talk about plant food. Well, the idea there being is that maybe you can ship that elemental phosphorus out to an area where they can have the raw materials and produce other fertilizers from that and save all that. Well, I don't know how high the fertilizers get; I suppose they've got experimental fertilizers that, in fact, get up to almost 100 percent.

CRAWFORD: It's certainly an improvement.

YOUNG: Oh, they don't give up. They're shooting higher all the time.

CRAWFORD: Were you able to get the personnel you needed throughout your years at TVA, and where did you recruit them?

YOUNG: Well, of course, in the early days the people came from all over the country, but as far as the plant operation is concerned, we obtained a lot of people from the colleges of this area, down at Auburn and Alabama, and Tennessee and so forth, which developed into a lot of the supervisory personnel. As far as the operators of the plant were concerned, we picked up local people and a lot of them had very little experience in those early days in any industrial operation--operating plants--but we were able to make operators out of them. And even so, in the early days it was claimed by some folks that TVA didn't know how to operate a synthetic ammonia plant. We developed personnel, and we operated a synthetic ammonia plant out there which I don't believe has lost a day's operation since World War II. It's mostly local people or some of the research people go out and recruit and bring in people from wherever they can find competent people.

I think another contribution TVA made here in the Muscle Shoals area is the bringing in or making it possible to bring in natural gas into this area.

CRAWFORD: How was that done, sir?

YOUNG: That was done through contracts with the gas company which laid a line and brought the gas in here and which the TVA and Reynolds really was responsible for and which now extends up and down the valley and is used all the way up to Huntsville and those places. But it was largely through TVA and Reynolds here that we brought natural gas in the valley here.

CRAWFORD: Thank you very much, Mr. Young.

